



Pesticide
Fact Sheet

Name of Chemical: Foramsulfuron
Reason for Issuance: Conditional Registration
Date Issued: March 27, 2002

1. **DESCRIPTION OF CHEMICAL**

Generic Name: 2-[[[[(4,6-dimethoxy-2-pyrimidinyl)-amino]carbonyl]amino]sulfonyl]-4-(formylamino)-N,N- dimethylbenzamide

Common Name: Foramsulfuron

Trade Name: Option Corn Herbicide

EPA Shaughnessy Code: 122020

Chemical Abstracts
Service (CAS) Number: 173159-57-4

Year of Initial
Registration: 2002

Pesticide Type: Herbicide

Chemical Family: Sulfonylurea

U.S. Producer: Aventis CropScience LLC

2. **USE PATTERNS AND FORMULATIONS**

Application Sites: Foramsulfuron is registered for use on field corn.

Types of Formulations: 94% technical product
35% water dispersible granular end-use product

Types and Methods
of Application: Ground application using standard commercial sprayers

Application Rates: Application rates of 1¼ to 1¾ ounces of formulated product (0.0273 to 0.0383 pounds active ingredient) per acre. A maximum of two applications are allowed per season resulting in a maximum potential seasonal application of 3½ ounces of formulated product (0.0766 pounds active ingredient) per acre.

Carrier: Water

3. **SCIENCE FINDINGS**

Summary Science Statements

Based upon a battery of acute toxicity studies, Option Corn Herbicide is classified as Toxicity Category III. Foramsulfuron is classified as a “not likely” human carcinogen. In the case of foramsulfuron, no adverse effects were observed in any of the submitted toxicological studies regardless of the route of exposure; therefore, an exemption from the requirements of a tolerance is warranted. The data available at this time indicate that foramsulfuron use presents a risk to non-target vascular plants in terrestrial and aquatic environments. However, no risk to non-target animals, insects, or non-vascular plants is expected from direct exposure to foramsulfuron. Parent foramsulfuron is only weakly sorbed to soils, but is relatively unstable and represents a low potential to leach to groundwater. The degradation products are generally more stable than the parent, but are more likely to bind to soil, and are therefore still unlikely to run off or leach.

Chemical Characteristics

Property	Technical	End-use
Physical State	Powder	Fine grained granule
Color	Light beige	Yellowish-brown
Odor	Slightly acidulous	Weakly aromatic
Melting Point	202°C	N/A
Density	1.44 g/cm ³ @ 20°C	0.56 g/mL @ 20°C
Solubility (Water)	3290 mg/L @ 20°C and pH 7	N/A
Vapor Pressure	4.2 X 10 ⁻¹¹ Pa @ 20 °C.	N/A
Octanol/Water Partition Coefficient	K _{ow} = 4.01 (in unbuffered distilled water @ pH 5.5 - 5.7)	N/A
pH	4.5 (1% dilution in distilled water)	6.7 (1% dilution in distilled water)

Toxicology Characteristics

Acute Toxicity of Foramsulfuron Technical			
Guideline No.	Study Type	Results	Toxicity Category
870.1000	Acute Oral - rat	LD ₅₀ > 5000 mg/kg	IV
870.1100	Acute Dermal - rat	LD ₅₀ > 2000 mg/kg	III
870.1200	Acute Inhalation - rat	LC ₅₀ > 5.04 mg/L	IV
870.2400	Primary Eye Irritation - rabbit	Slight irritation clearing within 48 hours	IV
870.2500	Primary Skin Irritation - rabbit	No dermal irritation	IV
870.2600	Dermal sensitization - guinea pig	Not a dermal sensitizer	N/A

Acute Toxicity of Option Corn Herbicide			
Guideline No.	Study Type	Results	Toxicity Category
870.1000	Acute Oral - rat	LD ₅₀ = 3881 mg/kg	III
870.1100	Acute Dermal - rat	LD ₅₀ > 5000 mg/kg	IV
870.1200	Acute Inhalation - rat	LC ₅₀ > 5.32 mg/L	IV
870.2400	Primary Eye Irritation - rabbit	Conjunctivitis; no positive scores by day 7	III
870.2500	Primary Skin Irritation - rabbit	Moderate erythema and slight edema at 72 hours	III
870.2600	Dermal sensitization - guinea pig	Sensitizer	N/A

Subchronic, Chronic, and Other Toxicity		
Guideline No.	Study Type	Results
870.3100	90-Day oral toxicity rodents	NOAEL = 1002 mg/kg/day, Highest Dose Tested (HDT)
870.3150	90-Day oral toxicity in nonrodents	NOAEL = 1000 mg/kg/day, HDT
870.3200	21/28-Day dermal toxicity	NOAEL = 1000 mg/kg/day, HDT
870.3700a	Prenatal developmental in rodents	Maternal and Developmental NOAEL = 1000 mg/kg/day, HDT
870.3700b	Prenatal developmental in nonrodents	Maternal and Developmental NOAEL = 500 mg/kg/day, HDT
870.3800	Reproduction and fertility effects	Parental/Systemic, Reproductive and Offspring NOAEL = 1082 mg/kg/day, HDT
870.4100a 870.4200	Chronic toxicity and Carcinogenicity rodents	NOAEL = 849 mg/kg/day, HDT no evidence of carcinogenicity
870.4100b	Chronic toxicity dogs	NOAEL = 1000 mg/kg/day, HDT
870.4300	Carcinogenicity mice	NOAEL = 1115 mg/kg/day, HDT no evidence of carcinogenicity
870.5100	Gene Mutation	Negative
870.5375	Cytogenetics	Negative
870.5385	Other Effects	Negative
870.7485	Metabolism and pharmacokinetics	Primarily excreted in feces as parent compound within three days of oral dosing.

Toxicological Endpoints

No adverse effects were observed in the submitted toxicological studies regardless of the route of exposure. Therefore, no toxicological endpoints were selected for foramsulfuron.

Human Exposures and Risks

Acute risk

Since the acute toxicity is low (toxicity categories III and IV) for all tests conducted, the occurrence of an effect of concern as a result of a one day or single exposure is highly unlikely, and, therefore, an acute dietary risk assessment was not conducted. It was determined that contribution of additional dietary risk due to drinking water consumption is insignificant.

Chronic risk

There were no observed adverse effects at the highest dose tested (500 mg/kg/day or higher) in any of the subchronic or chronic toxicity tests conducted. The August 1998 OPPTS Series 870 Harmonized Test Guidelines for health effects recommend for subchronic and chronic testing the highest dose tested should not exceed 1000 mg/kg/day using the procedures described for these studies, unless potential human exposure data indicate the need for higher doses. A dose of 1000 mg/kg/day is equivalent to a diet in which the pesticide comprises approximately 7% of dietary consumption. Similarly, the lowest high dose tested in the studies, 500 mg/kg/day, is equivalent to a diet in which the pesticide comprises approximately 3.5% of the dietary consumption. In normal food consumption, humans would be exposed to much less foramsulfuron than 3.5% of the dietary consumption. Therefore, it was determined that a chronic dietary risk assessment of foramsulfuron in food is not needed and, therefore, none was conducted. It was also determined that contribution of additional dietary risk due to drinking water consumption is insignificant.

Determination of Safety

Based on low toxicity of foramsulfuron and the rationales described above, HED concludes that there is a reasonable certainty that no harm will result to the general population, and to infants and children from aggregate exposure to foramsulfuron residues.

Environmental Characteristics

STUDY TYPE	HALF LIFE/OTHER
Hydrolysis	Stable
Photolysis in Water	Stable
Photolysis on Soil	Stable
Aerobic Soil Metabolism	40 days
Anaerobic Aquatic Metabolism	76 days
Sorption to Soils	Weakly sorbed to soils
Terrestrial Field Dissipation	11 to 18 days

Potential to Contaminate Groundwater

Parent and a suite of structurally similar transformation products have low sorptivity to soil, and, judging by this measure alone, are prone to leach and to run off. However, relatively short environmental life times and progressive formation of large fractions of by-products which resist extraction (or “bound residues”) make leaching and running off less likely.

Ecological Characteristics

Terrestrial

Foramsulfuron is classified as practically non-toxic to birds on both an acute and sub-acute basis (no definitive acute oral LD₅₀ or LC₅₀ values were determined for mallard ducks or bobwhite quail). It is practically non-toxic to small mammals (LD₅₀ > ranging from 2788 mg/kg to greater than 5000 mg/kg) and practically non-toxic to honey bees (LD₅₀ > 163 µg/bee).

Aquatic - Freshwater

Foramsulfuron is practically non-toxic to the bluegill sunfish (96-hour LC₅₀ > 102.7 ppm) and practically non-toxic to the rainbow trout (96-hour LC₅₀ > 100.9 ppm). It is also practically non-toxic to *Daphnia magna* (48-hour EC₅₀ > 102.5 ppm).

Aquatic - Estuarine/Marine

Foramsulfuron is slightly toxic to the sheepshead minnow (96-hour LC₅₀ > 93.6 ppm). It is practically non-toxic to the eastern oyster (96-hour LC₅₀/EC₅₀ > 120 ppm) and slightly toxic to the grass shrimp *Palaeomonetes pugio* (96-hour LC₅₀/EC₅₀ > 92.7 ppm).

Plants

Foramsulfuron is highly toxic to terrestrial plants. Seedling emergence studies identified the most sensitive species to foramsulfuron being lettuce (EC₂₅ = 0.0088 pounds active ingredient/acre). Vegetative vigor studies with foramsulfuron identified the tomato as the most sensitive species (EC₂₅ = 0.0012 pounds active ingredient/acre).

Mechanism of Pesticidal Action

Foramsulfuron inhibits the synthesis of amino acid in plants through inhibition of acetolactate synthase (ALS). This process results in slow or stunted plant growth and/or ultimate plant death.

4. **SUMMARY OF REGULATORY POSITION AND RATIONALE**

Available data provide adequate information to support the conditional registration of Option Corn Herbicide for use on field corn.

Use, Formulation, Manufacturing Process or Geographic Restrictions

Environmental Hazards

This product is toxic to non-target plants. Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark.

This product has a high potential for runoff after application. Poorly draining soils and soils with shallow water tables are more prone to produce runoff that contains this product. A level, well-maintained vegetative buffer strip between areas to which this product is applied and surface water features such as ponds, streams, and springs will reduce the potential for contamination of water from runoff. Runoff of this product will be reduced by avoiding applications when rainfall is forecasted to occur within 48 hours. Sound erosion control practices will reduce this product's contribution to surface water contamination.

Use Directions - General Precautions

Do not apply by air.

Do not apply this product through any type of irrigation system.

Do not apply this product when weather conditions favor spray drift to off-site vegetation as injury may occur.

Do not use nitrogen solutions as spray carriers.

If corn crop has been destroyed, corn can be replanted 7 days after an application of Option Corn Herbicide and soybeans can be planted 14 days after an application of Option Corn Herbicide. All other crops can be planted 60 days after an application of Option Corn Herbicide.

Use Directions - Field Corn

Do not apply more than 1 $\frac{3}{4}$ oz. of product per acre per application of more than 3 $\frac{1}{2}$ oz. product per acre during a single growing season.

Do not apply more than two applications to corn in one growing season.

Do not apply within 70 days of harvesting corn grain or 45 days of harvesting corn forage. Do not graze within 45 days after application.

5. **SUMMARY OF DATA GAPS**

Ecological Effects Data:

- Fish early life stage study
- Seed Germination/Seedling Emergence (conducted using end-use product)
- Vegetative Vigor (conducted using end-use product)
- Aquatic Plant Growth Study - Tier II (conducted using end-use product)

6. **CONTACT PERSON AT EPA**

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